

Innovative Fuel Cell Health Monitoring IC, Phase I

Completed Technology Project (2009 - 2009)



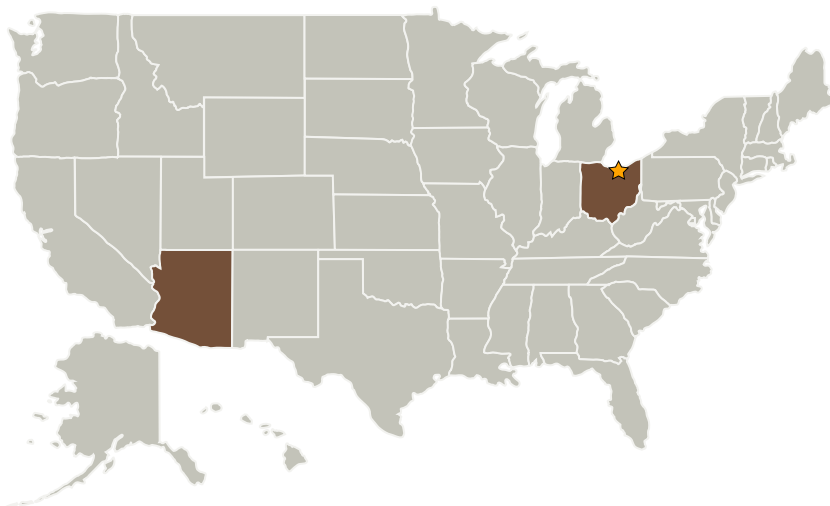
Project Introduction

Energy storage devices, including fuel cells, are needed to enable future robotic and human exploration missions. Historically, the reliability of the fuel cells has been problematic, including the scrubbed launch of the Atlantis Space Shuttle in September, 2006, and Endeavor in August, 1995. A 2007 Department of Energy report indicated that, "Component degradation and failure mechanisms are not well understood, which makes mitigation strategies necessary." A key method of monitoring the performance and mitigating voltage problems is to precisely monitor the voltage from the individual cells. This can be facilitated through the development of a novel Application Specific Integrated Circuit (ASIC). Ridgetop Group, Inc. proposes to develop this ASIC for NASA's Fuel Cell voltage monitoring, with the added features of being radiation-tolerant, and including in-situ component degradation functions, which support IVHM initiatives within NASA. In addition, Ridgetop will design the ASIC to add tolerance to space radiation effects, and prognostics-enable the ASIC to provide advance notice of impending failures using in-situ test structures from Ridgetop's Sentinel Silicon

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library. There is currently no ASIC that is capable of providing the foregoing capabilities, so it will be unique and very useful to NASA.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Ridgetop Group, Inc.	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Tucson, Arizona

Primary U.S. Work Locations

Arizona	Ohio
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.2 Energy Storage
 - └ TX03.2.2 Electrochemical: Fuel Cells